SYNALPHEUS AGELAS, NEW SPECIES OF SNAPPING SHRIMP FROM THE GULF OF MEXICO AND BAHAMA ISLANDS (DECAPODA:CARIDEA:ALPHEIDAE)

Linda H. Pequegnat and Richard W. Heard

ABSTRACT

A new species of snapping shrimp from the Gulf of Mexico and Bahama Islands, *Synalpheus agelas*, is described, illustrated, and compared to other species of the genus. Notes on its association with the orange demosponge, *Agelas dispar*, and other invertebrate associates are given. A key to the species of *Synalpheus* with the carpus of the second pereiopod composed of four articles is presented.

Species of the genus *Synalpheus* are common in coral reef environments of the tropical and subtropical areas of the world. Chace (1972) lists a total of 27 species of *Synalpheus* from the western Atlantic Ocean. This new species of *Synalpheus* was first discovered in collections made by Thomas J. Bright during a study of the biota of the West Flower Garden Coral Bank in the northwestern Gulf of Mexico and was reported from there by Pequegnat and Ray (1974) as "*Synalpheus* sp. (near *S. rathbunae* Coutière, 1909)." It was one of eight species of *Synalpheus* taken at West Flower Garden Bank and was one of the most abundant of the decapod species found there. It has subsequently been found at the Florida Middle Ground off the west coast of Florida and off Grand Bahama Island in collections made by Thomas S. Hopkins, Eric H. Livingston, J. Kevin Shaw, and Joan Uberlacker from the same habitat as the West Flower Garden Bank specimens, i.e., inhabiting the depressions of an orange demosponge, *Agelas dispar* Duchassing and Michelotti, 1864. The species has also been collected from other hard banks in the northwestern Gulf of Mexico by Thomas J. Bright.

The male holotype, female allotype, and several paratypes have been deposited at the Smithsonian Institution. The remainder of the paratypes are being retained at the Texas A&M University Systematic Collection of Marine Organisms and at the Marine Environmental Sciences Consortium Museum at Dauphin Island, Alabama.

Synalpheus agelas new species
Figures 1–4

Synalpheus sp. (near *S. rathbunae* Coutière, 1909) Pequegnat and Ray, 1974, p. 250, figs. 58, 59.—Ray, 1974,[1] p. 163, figs. 150–161.

Material examined.—HOLOTYPE: Male, 4.6 mm CL, USNM171424; Sta. WFG 710625, 27°52′N, 93°48′W, West Flower Garden Bank, Gulf of Mexico, 2[illegible] m. ALLOTYPE: Ovigerous female, 5.6 mm CL, USNM171425; BLM Dive Sta. 146, 28°41.1′N, 84°23.2′W, Florida Middle Ground, Gulf of Mexico, 30–34 m. PARATYPES: NORTHWESTERN GULF OF MEXICO (T. J. Bright Coll.). West Flower Garden Bank: 27° 52′N, 93°48′W, Sta. WFG 710625, 25 m, 5 ♀ (3 ovig.); Sta. WFG 711009, 25 m, 66 spec. (9 ovig.); Sta. WFG 720112, 25 m, 1 ovig. ♀; Sta. WFG 731006, 64–91 m, 1 spec.—Hospital Rock: 27° 32′N, 96°28′W, 59 m, Sta. 76G8-III, Sub 76-20, 4 spec.—North Hospital Bank: 27°34′N, 96°28.5′W, 57 m, Sta. 75G7-4, Sub 75-10, 7 spec.—28-Fathom Bank: 27°55′N, 93°27′W, 52 m, Sta. 76G8-II, Sub 76-9, 1 spec.—Unnamed Bank, also known as 28-Fathom Bank, Southwest Peak: 27°53′N, 93°27′W, 69 m, Sta. 76G8-II, Sub 76-16, 3 spec. NORTHEASTERN GULF OF MEXICO. Florida Middle Ground (Thomas S. Hopkins, Coll.): BLM Dive Sta. 147, 28°36.8′N, 84°20.5′W, 30–34 m, 29 spec. (7 ovig.); BLM Dive Sta. 151, 28°32.3′N, 84°18.7′W, 30–34 m, 18 spec. (5 ovig.); BLM Dive Sta. 146, 28°41.1′N, 84°23.2′W, 30–34 m, 6 spec. (1 ovig.); BLM Dive Sta. 247, 28°36.3′N, 84°15.8′W, 30–34 m, 3 spec.; BLM (MAFLA 1974) Sta. II-C, 28°41′N, 84°32.3′W, 30–34 m, 5 spec. (2 ovig.); BLM (MAFLA 1974) Sta. II-A, 28°42′N, 84°26.5′W, 30–34 m, 2 spec. WESTERN

[1] Ray, J. P. 1974. A study of the coral reef crustaceans (Decapoda and Stomatopoda) of two Gulf of Mexico reef systems: West Flower Garden, Texas and Isla de Lobos, Vera Cruz, Mexico. Unpublished dissertation (Ph.D. in Oceanography , Texas A&M Univ. 323 pp.

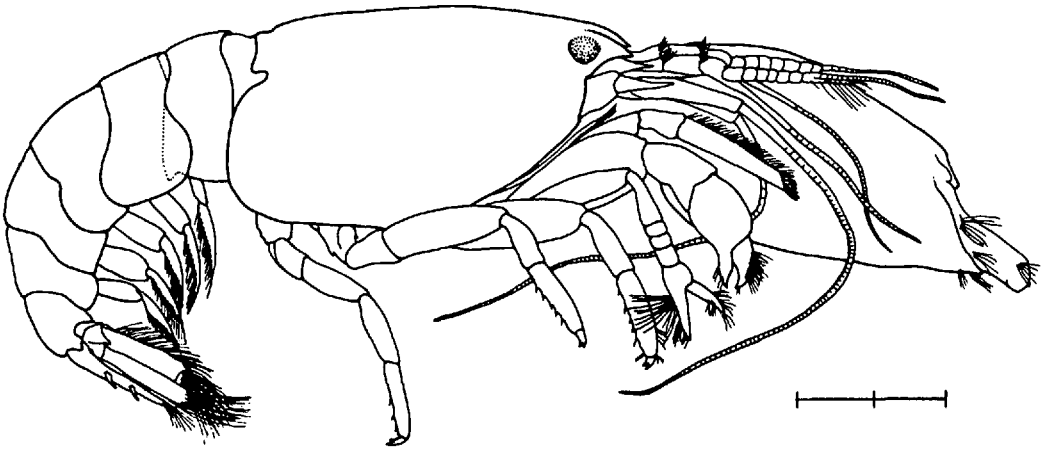

Figure 1. Male *Synalpheus agelas* (5.1 mm carapace length, Florida Middle Ground), lateral view. Scale = 2 mm.

ATLANTIC. Bahamas (Joan Uberlacker, Coll.): Grand Bahama Island, 26°30'N, 78°34'W, 20 m, 63 spec. (22 ovig.), 1 parasitized with branchial bopyrid isopod.

Measurements.—Male holotype with CL (carapace length from base of rostrum to midposterior margin of carapace) 4.6 mm, major chela 6.0 mm, palm 4.5 mm, movable finger 1.5 mm. Female allotype with CL 5.6 mm, major chela 5.8 mm, palm 4.4 mm, movable finger 1.4 mm.

Diagnosis—Ocular teeth blunt, not tapering to slender sharp tips; posterior pair of dorsal spines of telson arising in posterior half of telson; stylocerite not overreaching basal segment of antennular peduncle; basicerite unarmed dorsally; lateral spine not reaching to tip of scaphocerite; scaphocerite with reduced blade; third maxilliped with circlet of spines at tip of distal segment; major first chela with distal process on palm blunt and curved slightly downward, movable finger curving over and beyond shorter fixed finger; movable finger of minor first chela subequally bidentate distally and with prominent fringe of long, distally curved hairs on extensor surface; carpus of second leg with four segments; lateral branch of uropod with one tooth (sometimes two closely placed teeth) on lateral margin proximal to movable spine.

Description.—Rostrum narrower than ocular teeth, slightly concave dorsally and convex ventrally, with rounded tip extending almost to tip of ocular teeth and falling far short of distal margin of basal segment of antennular peduncle. Ocular teeth with blunt tips, not tapering to slender sharp tips, separated from rostrum by rounded V-shaped sinus. Carapace smooth and rounded, no adrostral depression or outline delimiting ocular area; smooth, not carinate, in dorsal midline. Pterygostomial angle of carapace slightly produced into rounded lobe.

Pleura of anterior five abdominal somites broadly rounded in female, that of sixth acuminate. Pleuron of first abdominal somite of male with hook-like tooth on posterior portion of ventral margin; pleura of remaining somites similar to those of female, except pleuron of fourth somite slightly angulate. Telson triangular with lateral margins slightly sinuous and posterior margin truncate; armed with two pairs of prominent spines, anterior pair situated slightly proximal to midlength of telson, posterior pair situated slightly closer to anterior pair than to posterior margin; posterior margin armed with two pairs of unequal movable spines, five to six unequal pairs of

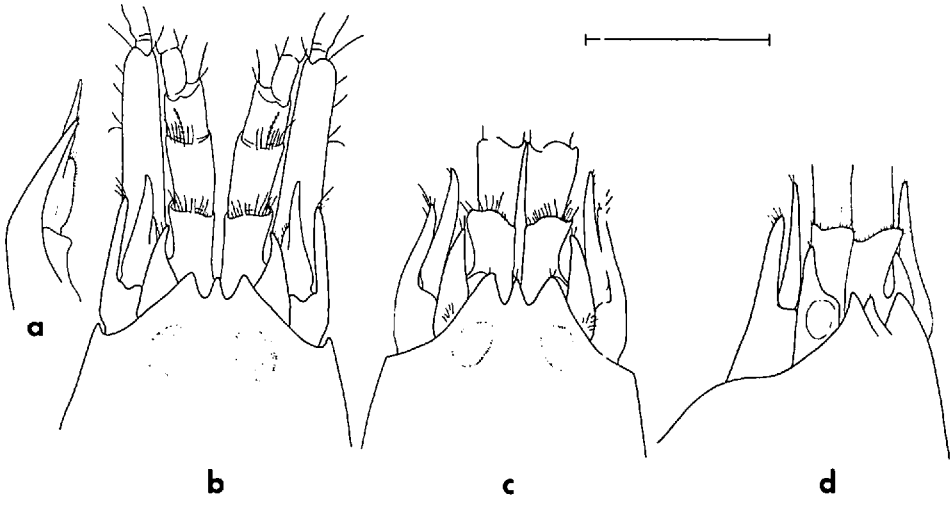

Figure 2. *Synalpheus agelas*: (a) Basicerite and scaphocerite with reduced blade from female (5.4 mm CL, Florida Middle Ground); (b) dorsal aspect, rostrum, scaphocerite, basicerite and stylocerite, female (5.1 mm CL, Florida Middle Ground); (c) Male holotype same aspect; (d) Male holotype dorsolateral aspect. Scale = 2 mm.

long terminal pinnate setae, and three to five pairs of subterminal shorter, smooth setae.

Antennular peduncle with stylocerite acute, reaching almost to level of distal margin of basal antennular segment. Segments of antennular peduncle rather long; third segment shorter than first or second.

Antenna with scaphocerite variable in length, reaching at least middle of second segment of antennular peduncle and sometimes beyond to distal end of second segment; blade reduced to a vestige in both sexes. Basicerite angular but not armed dorsally; lateral spine long and prominent, falling short of tip of antennal scale. Distal segment of peduncle six times as long as broad, overreaching antennular peduncle by less than one-fourth of its length.

Third maxilliped reaching considerably beyond antennal peduncle, with circlet of spines at tip of distal segment; exopod falling short of end of antepenultimate segment.

Major first pereiopod with chela overreaching antennal peduncle by nearly two-thirds of its length. Chela more than twice as long as broad; fingers less than half as long as palm, movable finger curving down over and beyond smaller fixed finger; palm terminating dorsodistally in blunt tooth curving slightly distoventrally. Carpus very short and broad. Merus unarmed, about half as long as palm. Minor first pereiopod overreaching antennal peduncle by entire length of chela; chela not quite half as broad as long; palm one-and-one-half times as long as fingers; movable finger subequally bidentate distally, with dense fringe of hairs on extensor surface; carpus about half as long as chela. Second pereiopod overreaching antennal peduncle by almost entire length of chela; fingers not quite twice as long as palm; carpus slightly longer than chela, composed of four articles, proximal article longest, equal to combined lengths of distal three articles; merus as long as or slightly longer than carpus. Third, fourth, and fifth pereiopods with diverging biunguiculate dactyls, proximal process subperpendicular to axis of dactyl and shorter and broader at base than distal process. Third pereiopod falling short of end of antennal peduncle; propodus six times as long as dactyl, entire flexor margin armed with 5–8 movable spinules; carpus about three-fourths

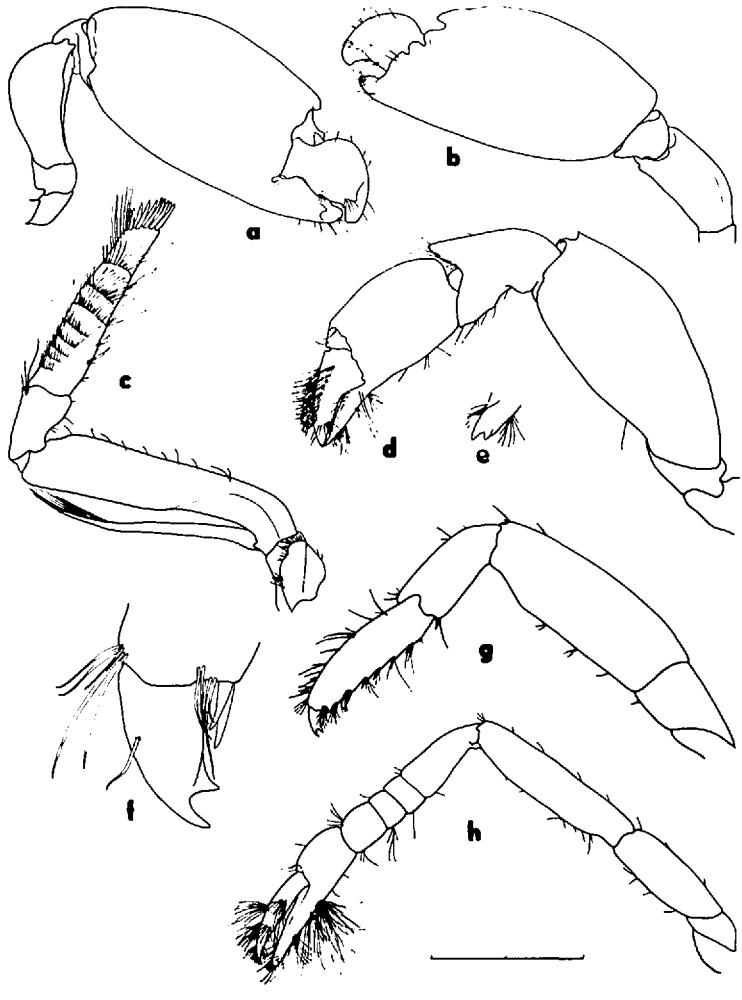

Figure 3. *Synalpheus agelas*: (a) first pereiopod, major chela, inner dorsolateral aspect (5.1 mm female, Florida Middle Ground); (b) first pereiopod, major chela, outer ventrolateral aspect (5.1 mm female, Florida Middle Ground); (c) right maxilliped, lateral aspect (male holotype); (d) first pereiopod, minor chela, inner dorsolateral aspect (male holotype); (e) tip of dactyl of minor chela (enlarged) (male holotype); (f) dactyl of right third pereiopod (enlarged) (male holotype); (g) right third pereiopod (male holotype); (h) right second pereiopod (male holotype). Scale for a & b = 2 mm; scale for c, d, g, and h = 1 mm.

as long as propodus, with tiny movable spinule at distal end of flexor margin, merus unarmed, relatively broad and flattened (2.6–2.8 times as long as broad), not quite one-and-one-half times as long as propodus. Fourth pereiopod with relative lengths of segments similar to third pereiopod. Fifth pereiopod with merus relatively shorter than in third and fourth, i.e., subequal to propodus length; merus narrower than in third and fourth legs; propodus with only three movable spinules located on distal portion of flexor margin.

Appendix interna on second to fifth pleopods in both sexes; endopod of first pleopod reduced in size in both sexes. Uropods

broad; lateral branch with one spine or two closely placed spines on lateral margin proximal to movable spine.

Color.—Body tan; chelae on first pereiopods pale with orange fingers.

Etymology.—The species is named for the genus of its sponge host.

Habitat.—Most of the specimens listed above were found inhabiting the depressions and interstices of the orange poecilosclerid demosponge, *Agelas dispar* Duchassaing and Michelotti, 1864, which lives on coral reefs and banks on the middle and outer continental shelf in the Gulf of Mexico and Caribbean Sea at depths of 19 to 91 m (Teerling, 1975,[2] p. 65).

A number of other macroinvertebrates occurred with *Synalpheus agelas* in association with *A. dispar.* Two ophiuroids, *Ophiactus savignyi* Müller and Troschel, 1842 (Flower Garden Bank) (Burke, 1974, p. 317) or *Ophiactus* sp. (not *savignyi*) (Florida Middle Ground and Grand Bahama Island), occurred in almost every sponge examined. *Synalpheus townsendi* Coutière, 1909, a nonobligate commensal, was often found with *A. dispar* from the Florida Middle Ground and Grand Bahama Island. A bivalve mollusk tentatively identified as *Hiatella artica* (Linné, 1767) (Doug Gilbert, Dauphin Island Sea Lab, Alabama pers. comm.) was a common associate in specimens of *A. dispar* from the Florida Middle Ground. Other associates from the eastern Gulf and the Bahamas were *Synalpheus pandionis* Coutière, 1909; *Pachycheles rugimanus* A. Milne-Edwards, 1880; and unidentified specimens of Mysidacea, Tanaidacea, and Cirripedia.

Type locality.—West Flower Garden Bank, northwestern Gulf of Mexico (27°52′N, 93°48′W) from 25 m depth, inside the orange demosponge, *Agelas dispar.*

Distribution.—Western Atlantic from the the Bahama Islands; Northern Gulf of Mexico from off west coast of Florida (Florida Middle Ground) to off Texas (West Flower Garden Bank, Hospital Rock, 28-Fathom Bank, and Unnamed Bank, also known as 28-Fathom Bank, Southwest Peak) at depths of 25–91 m.

Remarks.—The presence of brush hairs on the movable finger of the minor first pereiopod places this species in the Gambarelloides Group (previously Laevimanus Group of Coutière, 1909—see Holthuis and Gottlieb, 1958, p. 48). In addition to *Synalpheus agelas*, six other species of *Synalpheus* are characterized by having only four articles in the carpus of the second pereiopod. Like *S. agelas*, four of these species, *S. barahonensis* Armstrong, 1949; *S. filidigitus* Armstrong, 1949; *S. rathbunae* Coutière, 1909; and *S. anasimus* Chace, 1972, are members of the Gambarelloides Group, and are only known from the northwestern Atlantic region. The other two species, *S. redactocarpus* Banner, 1953 from Hawaii and *S. quadriarticulatus* Banner and Banner, 1975 from Australia apparently do not belong to the Gambarelloides Group.

It should be noted that immature specimens of *S. brooksi* Coutière, 1909 and *S. longicarpus* Coutière, 1909 from the northwestern Atlantic, and *S. demani* Borradaile, 1900 (Miya, 1972) from the western Pacific have been reported with only four articles in the carpus of the second pereiopod. Coutière (1909) and Miya (1972) attributed the reduction of carpal articles in these specimens to immaturity. Banner and Banner (1975) suggested the possibility that the holotype and only known specimen of *S. redactocarpus* Banner, may be a juvenile and they did not rule out the possibility that the reduction of the carpal articles in this specimen was due to the degree of development.

Synalpheus agelas is most closely related to *S. rathbunae* Coutière, 1909 and *S. barahonensis* Armstrong, 1949. It is distinguished from the former in that (1) the

[2] Teerling, J. 1975. A survey of sponges from the northwestern Gulf of Mexico. Ph.D. Dissertation, Univ. Southwestern Louisiana. 187 pp.

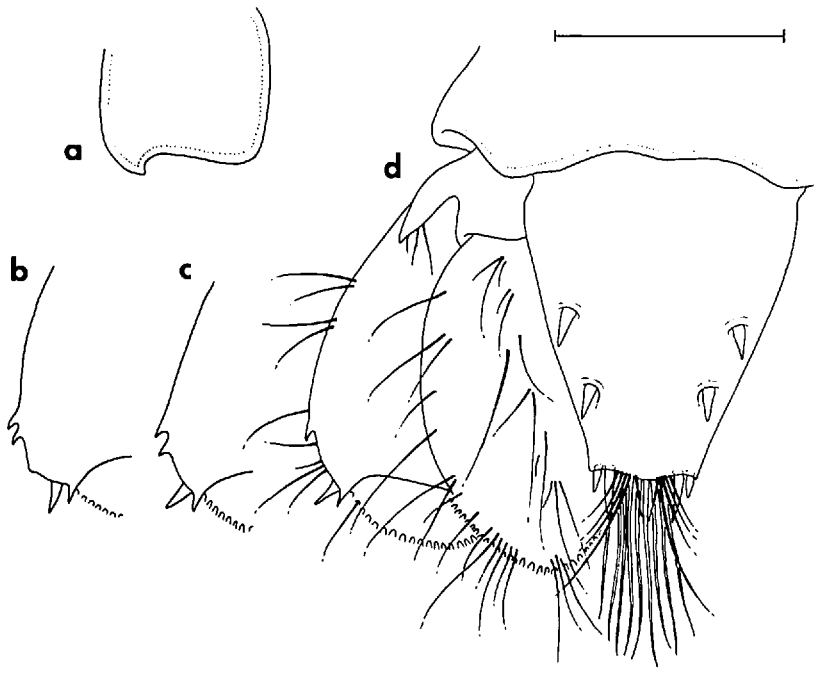

Figure 4. *Synalpheus agelas*: (a) right ventral margin of first abdominal segment (4.9 mm CL male from Florida Middle Ground); (b, c) outer margin of left uropodal exopodite of two ovigerous females from Florida Middle Ground; (d) telson and left uropod of 5.1 mm female from Florida Middle Ground. Scale = 1 mm.

stylocerite reaches nearly to the distal end of the basal segment of the antennular peduncle, (2) the upper angle of the basicerite is unarmed dorsally, (3) the blunt tooth on the anterior palm of the major chela points slightly downward, not upward, (4) the movable finger of the minor first chela is subequally bidentate, and (5) the external branch of the uropod has one spine (or sometimes two) proximal to the movable spine; when there are two spines, they are more closely spaced than in *S. rathbunae*.

Synalpheus agelas is distinguished from *S. barahonensis* in that (1) the lateral spine of the basicerite falls short of the extremity of the scaphocerite, (2) a reduced blade is present on the scaphocerite, (3) the third maxilliped has a circlet of spines at the tip of the last segment, (4) the merus of the third pereiopod is broader (2.6–2.8 times as long as wide in *S. agelas* versus 3.7 times as long as wide in *S. barahonensis*).

It differs from both of those species in the arrangement and number of spines and setae on the posterior margin of the telson (Fig. 4).

Key to the Species of *Synalpheus*

with carpus of second pereiopod composed of 4 articles (modified in part from Chace, 1972)

1a. Scaphocerite with well developed blade (squame); telson lacking dorsal spines..... ..... *S. redactocarpus* Banner, 1953

1b. Scaphocerite with blade greatly reduced or lacking; telson with two pairs of well developed dorsal spines. 2

2a. Fingers of minor chela of first pereiopod broadened and flattened, lacking prominent fringe of long, distally curved hairs on movable finger. .... *S. quadriarticulatus* Banner & Banner, 1975

2b. Fingers of minor chela of first pereiopod not broadened or flattened, provided with prominent fringe of long, distally curved hairs on movable finger. 3

3a. Carapace carinate anteriorly in dorsal midline; both pairs of dorsal spines of telson arising in anterior half of segment. ..... ♂ *S. anasimus* Chace, 1972 (*S. anasimus* ♀ has carpus of second pereiopod with 5 segments, in contrast to the ♂ which has only 4).

3b. Carapace not carinate in anterior dorsal midline; posterior pair of dorsal spines of telson arising in posterior half of segment. 4

4a. Basicerite with strong dorsal spine..... 5

4b. Basicerite unarmed dorsally. 6

5a. Major chela of first pereiopod with tubercle at distal end of palm armed with small, sharp anteroventral tooth; fingers of chela of second leg filiform. ..... *S. filidigitus* Armstrong, 1949

5b. Major chela of first pereiopods with tubercle at distal end of palm not armed with sharp tooth; fingers of chela of second legs not filiform. ..... *S. rathbunae* Coutière, 1909

6a. Third maxilliped with cluster of setae on tip of distal segment; basicerite nearly equal in length to scaphocerite ..... *S. barahonensis* Armstrong, 1949

6b. Third maxilliped with circlet of 8 to 10 spines on tip of distal segments; basicerite less than ¾ length of scaphocerite. ... *S. agelas*

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ADDRESSES: (*L.H.P.*) *Department of Oceanography, Texas A&M University, College Station, Texas 77843; (R.W.H.) Gulf Coast Research Laboratory, Ocean Springs, Mississippi 39564.*